Giardia muris and *Giardia microti* produce a readily recognizable enteritis in mice, and both binary and multiple fission take place in the free non-encysted stage—there is no *Octomitus* stage. The morphological characters separate six species. The parasite in mice appears to be distinct from that in man.

4. *The Inorganic Constituents of Alcyonaria:* F. W. CLARKE and W. C. WHEELER, United States Geological Survey, Washington.

The stony corals have been repeatedly analyzed, and with generally concordant results. Thirty analyses here made have confirmed the older data. The object of the investigation is to determine what each group of organisms contributes to the formation of marine limestones. The highest proportions of calcium phosphate are commonly associated with high values for magnesia.

5. *An Experimental Analysis of the Origin and Relationship of Blood Corpuscles and the Lining Cells of Vessels:* CHARLES R. STOCKARD, Department of Anatomy, Cornell University Medical School.

Vascular endothelium, erythrocytes and leucocytes, although all arise from mesenchyme, are really polyphyletic in origin; that is, each has a different mesenchymal anlage.

EDWIN BIDWELL WILSON

SPECIAL ARTICLES

INTERFERENCES WITH TWO GRATINGS

IF two identical grating are placed with the ruled faces and rulings in parallel and the horizontal and transverse axes of their spectra (of the same side and order) in coincidence, white light passed through them from the collimator of a spectrometer shows intense, nearly equidistant, vertical interference fringes in the telescope. The path difference is subject to the equation $e(1 - \cos\theta)$, where e is the distance apart of the ruled faces and θ the angle of diffraction. These fringes therefore belong to the coarse set which I described elsewhere. Though not exceptionally sensitive to displacements of either grating, they are available throughout a relatively large interval; *i. e.*, e may be increased from coincidence to over 2 cm. As two stretched films suffice, these strong fringes admit of many practical applications.

A more interesting class of fringes may be observed, when the light used in the same instrument is homogeneous. There are three types of these fringes of constant wave-length. The first of these is obtained with the same adjustment for coincident longitudinal and transverse spectrum axes, but needs a wide slit. Obliquity of the incident rays here replaces the above color difference. The second class appears with a fine slit, coincidence of longitudinal axes, but in the absence of coincidence of transverse axes (in which adjustment the fringes would be of infinite size). They are thus evoked by a difference in the angle of incidence at the two gratings, respectively. Frequently they are seen to best advantage with the naked eye or a lens. They increase in size as the eye is withdrawn from the grating; or if seen in the telescope, if the ocular is either pulled out or pushed in from the position for the principal focus where D lines only are seen. For any given position of the eye they do not vary in size while either grating is displaced from coincident position, to the position of vague evanescence, 4 or 5 millimeters beyond. Both this and the following fringe patterns rotate rapidly with the slight rotation of either grating in its own plane.

The third class is obtained in the absence of a collimator and is due to the varying obliquity of diffuse homogeneous light. The longitudinal spectrum axes must coincide, but the transverse axes need not. They are very strong, best seen with the naked eye or lens, but admit of relatively little displacement of either grating, as they vanish with increasing smallness. They usually lie in a definite focal plane, which recedes to infinity as the gratings are more and more separated.

Finally it is interesting to note that phenomena of a somewhat similar kind may be obtained with reversed spectra.

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